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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,628	03/29/2004	Tapesh Yadav		2732

24959 7590 07/08/2009  
PPG INDUSTRIES INC  
INTELLECTUAL PROPERTY DEPT  
ONE PPG PLACE  
PITTSBURGH, PA 15272

EXAMINER
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LE, HOA T

ART UNIT	PAPER NUMBER
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1794

MAIL DATE	DELIVERY MODE
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07/08/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/811,628	<b>Applicant(s)</b> YADAV ET AL.	
	<b>Examiner</b> H. (Holly) T. Le	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-42 and 46-49 is/are pending in the application.
- 4a) Of the above claim(s) 4,6-18,24-27,29-32 and 35-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5,19-23,28,33,34 and 46-49 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 112***

2. EXAMINER'S NOTES: Applicant cited various paragraph numbers purportedly from the instant specification in their arguments; however, none of these paragraph numbers match the actual paragraph numbers in the subject specification, but rather they are paragraph numbers from the US publication of the present application (US 2004/0180203). It is advised that it's Applicant's duty to be diligent in their response/arguments to recite proper and accurate paragraph numbers from the instant specification for the arguments to be considered. In the future, if the Examiner cannot find the specific material from the cited paragraph number, the argument will be dismissed as baseless and irrelevant.

3. **Claims 1, 5, 19-23, 28, 33, 34, and 46-49 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement as applied to the rejections of claims 1, 5, 19-23, 28, 33, 34 and 45 set forth in the last office action and further discussed below.** The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

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3.1. As stated in the previous office actions, although the specification describes a method of making polymetallic material having an aspect ratio of up to 25 (paragraphs [0090], [0093], and [0096]), such method is not described to extend to chalcogenides in terms of aspect ratio. How the same method can be applied to chalcogenides to obtain an aspect ratio of greater than 5 is not described. Chalcogenides and polymetallic materials are two chemically and physically different materials. Therefore, a method that is successful in making one material of certain morphology cannot be used to produce the other with the same morphology. The specification fails to describe how that can be done, and thus the claims are based on a non-enabling disclosure. More particularly, the method of making non-stoichiometric materials as described at paragraphs [0120] to [0129] can not be resulted in a structure wherein the aspect ratio is at least 5. The method as disclosed in these paragraphs does not enable one of skilled in the art to control or manipulate the production conditions such that an aspect ratio of greater than 5 can be resulted for non-stoichiometric.

3.2. Applicant argued that the specification provides support for chalcogenide nanomaterials having an aspect ratio as claimed by citing paragraphs [0119]. Note that paragraph [0119] [sic] describes “multimetallic powders” while claims 1, 5, 19-23, 28, 33, 34 and 45 are broad enough to include chalcogenides which are binary materials comprising one of S, Te or Se element and one more electropositive element. Thus the cited paragraph does not support the broad scope of the claimed invention. Applicant further cited Example 8 which shows WO<sub>3</sub> nanowhiskers and nanorods having an aspect ratio of 5 to 15 as a support for claims and particularly claims 19-20.

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Note that this argument has been rejected in the last office action because  $\text{WO}_3$  is a metal oxide, not a chalcogenide. Although oxygen is a chalcogen, a binary compound containing a metal and an oxygen is a metal oxide, not a chalcogenide. Chalcogenide is named for materials that contain chalcogens other than oxygen, namely S, Se and Te. Thus  $\text{WO}_3$  is NOT a chalcogenide as required in instant claims. In addition, none of these materials are non-stoichiometric as required by claims 1 and 33 or claims 19 and 20 as amended.

3.3. With regard to claims 48 and 49, Applicant cited paragraphs [0083] to [0088] *[sic]*, note that the specification provides support for "Z" being a chalcogen element, but not a "chalcogennide", which is a compound. Thus, the instant specification provides no support for claims 48 and 49.

4. Applicant further argued that the support for the instant claims 1, 5, 21-23, 28, 33 and 34 can be found in the Bickmore patent which is incorporated by reference in the Subject Application. Note that the only place where Bickmore is incorporated by reference is paragraph [0088] of the instant specification, and the material incorporated is "nanostructured fillers" or "nanofillers" which is defined as fillers for a composite, and such nanofillers are not described as comprising "chalcogenides" and/or being non-stoichiometric" as the nanomaterial of the instant claims. Other paragraphs where Bickmore is simply either "cited" or "recited (i.e. paragraphs [0089], [0092] and '0096]) do not describe nanomaterial that comprises chalcogenides and/or is non-stoichiometric as claimed.

Applicant contended that in the description:

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“The multimetallic powders include at least two elements selected from the s group, p group, d group, and f group of the periodic table (e.g.,...sulfur...), and may include three or more such elements...The multimetallic powders may also comprise nanowhiskers and/or nanorods, with aspect ratios in a range of 1- 25”,

“the p-group of the periodic table includes chalcogenides”. It should be noted that the cited paragraph describes multimetallic powders. The instant claims 1, 5, 19-23, 28, 33, 34 and 46 do not include such limitation, i.e. multimetallic, and are broad enough to include monometallic binary chalcogenides which find no support in the cited paragraph.

#### **NEW REJECTIONS:**

**5. Claims 46 and 47 are further rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The nanomaterial is described to be converted to non-stoichiometric material by “solvent extraction, electrochemical transformation, electromagnetic field treatment, ion beam treatment, electron beam treatment, photonic treatment, rapid quench, plasma treatment, nuclear radiation, supercritical phase treatment, biological treatment, or a combination thereof.” It cannot be seen how any of these methods could possibly be conducted or result in the conversion as claimed. Although “electrochemical transformation, electromagnetic field treatment, ion beam treatment, electron beam treatment, photonic treatment, rapid quench, plasma treatment, nuclear radiation, and supercritical phase treatment” are known, it is not known how to apply such method to convert a stoichiometric nanomaterial into a non-

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stoichiometric material. These methods are extremely complex, without describing how it is done, one skilled in the art would not be able to make the material as claimed. In addition, it cannot be seen how "solvent extraction" or "biological treatment" would convert a chalcogenide nanomaterial into a non-stoichiometric chalcogenide nanomaterial. Without adequate description of the processing details, one skilled in the art would not be able to make the material as claimed.

***CLAIM REJECTIONS - 35 USC § 102/103***

**6. Claims 1, 5, 19-23, 28, 33, 34, and 46-49 are rejected under 35 U.S.C. 102(b) or (e) as being anticipated by Bickmore et al (US 5,984,997) as applied to the rejection to claims 1-3, 5, 19-23, 28, 33, and 34 set forth in the last office action and further discussed below.**

6.1. Applicant argued that Bickmore fails to teach or suggest nanomaterials transformed to non-stoichiometric after formation. Applicant appears to argue as to the process limitation; that is the transformation to non-stoichiometric material has to take place after the formation of the stoichiometric material. Note that the instant claims are product claims; therefore, how or when the material is obtained is not a factor to determine patentable distinctiveness in a product claim. It has been held that "even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product by process claim is the same as or obvious from a product of the prior art, the claim is

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unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964,966 (Fed Cir. 1985) and MPEP 2113.

**7. Claims 1, 5, 19-23, 28, 33, 34, and 45 are rejected under 35 U.S.C. 102(b) or (e) as being anticipated by US 6,344,271 ("US'271").**

7.1. Applicant argued that the broad teaching of nanomaterial having an aspect ratio greater than 1 and up to  $10^6$  of US'271 provides no "sufficient specificity" to constitute an anticipation. Note that at col. 10, lines 57 to col. 11, line 4, US'271 teaches the ratio relationship between the domain size and the mean free path of the electrons of a given nanomaterial being less than 5; and also a domain size of less than 100 nm, which teachings suggest nanomaterial of aspect ratio of less than 25. Therefore, the teaching of US'271 provides sufficient specificity to constitute an anticipation to the claimed invention.

7.2. Non-stoichiometric nanomaterials as described in claims 48-49 are taught at col. 10, lines 10-45.

### ***Double Patenting***

**8. Claims 1, 5, 19-23, 28, 33, 34 and 46-49 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 11, 14, 20, 23, and 35-45 of U.S. Patent No. 6,344,271 ("US'271").**

9. Applicant did not argued as to this rejection; therefore, it is assumed that Applicant agrees with the Examiner's position.



**10. Claims 19 and 20 are now amended to include the “non-stoichiometric” limitation; therefore the rejection based on the Gibson patent (US 6,156,428) is hereby withdrawn.**

**Examiner’s Notes/Warning:**

11. Applicant is advised that the delay of filing the instant claims, which claims in this case are broader than the claims of previously related applications, without the benefit of a restriction requirement, may give the appearance of prosecution latches. The doctrine of prosecution latches renders patented claims unenforceable. In re Bogese II, 303 F.3d 1362, 1369 (Fed. Cir. 2002).

***Conclusion***

12. Applicant's amendment failed to overcome the rejections set forth in the previous office actions and necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. (Holly) T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 12:30 p.m. to 9:00 p.m. (EST), Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. (Holly) T. Le/  
Primary Examiner, Art Unit 1794

July 6, 2009